

Attachment 5 Work Plan

Purpose and Need

Purpose

The purpose of the proposed Study is to provide important data and geologic information to determine if portions of CVP Park in the La Crescenta area of Los Angeles County can be utilized for stormwater capture for groundwater recharge. The Study is first phase of a two-phase project. The first phase will determine project feasibility and the second phase will construct facilities including the infiltration galleries to capture stormwater and dry-weather runoff. Recharging the Verdugo Basin will help reduce the current wide fluctuation in groundwater levels during dry and wet rainfall years. In addition, it will help improve groundwater quality, increase water-supply reliability, and improve surface water quality in downstream receiving waters.

The Study will investigate the feasibility and effectiveness of the following:

- Constructing facilities to divert stormwater flow from the Verdugo Wash and Dunsmore Channel to infiltration basins in CVC Park.
- Using the same infiltration basins for diverted dry weather runoff from the CVC Park parking lot.

The potential increase in groundwater storage was addressed in a previous AB303 grant project titled "Verdugo Basin Groundwater Recharge, Storage and Conjunctive Use Feasibility Study" that focused on CVWD using a greater portion of its local groundwater source to maintain water levels within the Verdugo Basin during dry years. The Conjunctive Use Feasibility Study stated that CVWD could reduce its demands on imported water from the Colorado River if CVWD has the ability to increase its groundwater source. Feasible approaches for artificial recharge of stormwater included capture of water flowing in the Verdugo Wash in the vicinity of CVC Park and recharging it using subsurface infiltration galleries.

The ULARA Watermaster is a strong advocate for conserving water supplies by capturing and recharging stormwater runoff including projects such as the CVC Park Study. This proposed Study supports the ULARA Watermaster's efforts in this regard.

The proposed scope of work for the Study includes several tasks to evaluate key considerations for the recharge of stormwater runoff:

- Availability and quality of stormwater runoff for recharge
- Ability of soils in the area to recharge underlying groundwater
- Depth to groundwater and available storage space for the recharged water
- Potential impacts to trees and to facilities and buildings in the area
- Locations for infiltration basins
- Benefits to local groundwater supplies and surface water supplies in the area

Need

Groundwater in the Verdugo Basin is the cornerstone of a reliable and safe long-term water supply for local citizens. However, the balance of the local water supply comes from imported water which is a less reliable supply than groundwater. Water supply reliability can be considerably improved and water supply costs reduced by capturing and recharging stormwater runoff to increase the amount of groundwater in storage.

The availability of groundwater supplies in the Verdugo Basin varies depending on rainfall in the area and supplies are diminished during dry years and periods of drought. During such times, CVWD and other local water purveyors must increase their purchases of more costly imported water, including waters from the Colorado River and northern California. The California Department of Water Resources has encouraged and supported programs to reduce reliance on imported water.

Some of the groundwater in the Verdugo Basin is impacted by nitrate contamination from historical septic systems in the area. The impacted groundwater requires treatment before it can be used. Capture and recharge of stormwater runoff will help improve groundwater quality in the area by introducing better quality water into the groundwater system.

Along with CVWD, a variety of agencies in the ULARA, including the ULARA Watermaster and the cities of Los Angeles and Glendale, have implemented or are participating in efforts to capture and recharge stormwater. The proposed CVC Park Study supports and complements these efforts and is consistent with the Standard Urban Stormwater Mitigation Plan (SUSMP) program currently supported by the ULARA Watermaster and the Los Angeles Regional Water Quality Control Board.

Goals and Objectives

The primary goal of this project is to conduct a Study to evaluate the feasibility of using portions of CVC Park to recharge stormwater runoff. The Study will evaluate the costs and benefits of implementation and determine the most effective strategy for developing this potentially significant source of water for CVWD.

Objectives to accomplish this goal include:

- Install surface water gauging stations in the CVC Park
- Monitor surface water that would be diverted for groundwater recharge
- Assess soil conditions through monitoring wells and percolation tests
- Conduct site topographic surveys
- Conduct groundwater modeling
- Establish a Task Force to guide and support the Study

Work Items

The following tasks listed in Table 5-1 and detailed below will be necessary to complete the proposed project.

Table 5-1: Local and Regional Agency Collaboration

| Task | Work Item |
|------|---|
| 1 | Gauging and verification of surface water flows and water quality in the Verdugo Wash |
| 2 | Drilling and Installing Monitoring Wells and Water Level Monitoring |
| 3 | Perform Infiltration Tests |
| 4 | Topographic Survey |
| 5 | Groundwater Modeling |
| 6 | Environmental and Regulatory Compliance and Permit Review |
| 7 | Development of CVC Park Stormwater Recharge Facility Study |
| 8 | Task Force Group |
| 9 | Administration |

Task 1: Gauging and verification of surface water flows and water quality in the Verdugo Wash

This task will be to install two water gauges in the Verdugo Wash and Dunsmore Channel respectively to obtain quantitative data for surface water flows during the dry and rainy seasons. The closest water gauging station, which is maintained by the Los Angeles County, Department of Public Works is located six miles downstream in the Verdugo Wash. As a result, there are no historical data available regarding surface water flows in the Verdugo Wash and Dunsmore Channel in the vicinity of the CVC Park or at other locations in the Verdugo Basin. The new water gauges will allow CVWD to gather accurate information instead of estimating surface flows from the downstream gauge. In addition, CVWD will be able to collect water quality samples at the gauge locations for testing of the water for contaminants such as oils and volatile organic compounds (VOCs). This task will require coordination with Los Angeles County, Department of Public Works with respect to access and maintenance agreements.

The following quality assurance measures will be in place under Task 1:

- Stream gauges to be installed and maintained under direction of a California Professional Engineer and supervised by personnel from Los Angeles County, Department of Public Works (LACDPW). The equipment shall be installed per LACDPW standards and according to standardized practices according to industry standards.
- Surface water sampling and recording of gauge levels will be conducted under the direction of a California Professional Engineer and recorded by CVWD personnel.

- Calibration of field sampling equipment to performed by equipment manufacturer and commercially-purchased standards
- Water Quality Samples - Use of field quality control samples (i.e. duplicates, trip blanks) and chain-of-custody procedures
- Water Quality Samples - Standardized reporting per industry-standard procedures
- Water Quality Samples - Analytical tests shall be performed by an EPA and California Certified Analytical Laboratory and comply California Code of Regulations and Chapter 19 Certification of Environmental Laboratories
- Preparation of a surface water quality report will be completed by a California Professional Engineer.
- Review of the Surface Water Quality Report by Dr. Iraj Nasser, Professor with the Department of Civil & Environmental engineering at the University of Southern California (USC) and input from the Task Force.

Subtask 1.1 Coordination and Agreement with LACDPW

This subtask will involve coordination with Los Angeles County, Department of Public Works with respect to access and maintenance agreements for installation, maintenance of stream gauges, and collection of water quality samples. This task will be completed by CVWD staff.

Subtask 1.2 Installation and Calibrating Channel Gauge

At the outset of this task, the locations of the proposed gauges and the planned monitoring program will be reviewed with Dr. Iraj Nasser, Professor with the Department of Civil & Environmental engineering at the University of Southern California (USC). Dr. Nasser will be involved with the task force and is a professional Engineer and Certified Hydrogeologist with the State of California. Dr. Nasser has been teaching groundwater management and modeling for a number of years. Dr. Nasser is also the Chief Hydrologist for the County of Los Angeles, Department of Public Works.

A low flow-rate monitoring device similar to that shown in Figure 5-1 will be used to monitor low flows in the Verdugo Wash and Dunsmore Channel. To monitor higher flows, a stand pipe secured to the side of the channel with a pressure transducer inside will likely be used.

Figure 5-1: Low Flow-Rate Monitoring Device

The data obtained from this task will assist in determining the types of stormwater capture facilities that could be installed, the volumes of stormwater runoff that could be captured, and the timing of stormwater capture in relation to storm events and dry-season periods of low flows in the channels. The data will also be used to estimate the size and number of infiltration galleries that could be installed for stormwater recharge. This task will be completed by a consultant.

Subtask 1.3 Water Quality Sampling and Analysis

The purpose of this subtask will be to monitor the fate and transport of runoff-borne pollutants by measuring stormwater quality at the surface, and to project how stormwater infiltrates through the soil to groundwater. The water quality assessment will consider possible impacts to the quality of groundwater extracted by CVWD's downgradient wells. To collect data for the evaluation, one location will be monitored for at least one winter season.

The water quality information will be useful to determine if any additional treatment will be needed before the stormwater is used for groundwater recharge. The Study will investigate the feasibility of reducing total maximum daily loads (TMDLs) within the Verdugo Wash. TMDLs are regulated by the State Water Resources Control Board under the federal Clean Water Act. TMDLs set the maximum amounts of specific pollutants that a body of water can receive while still meeting water quality standards.

CVWD is within the Los Angeles River Watershed area and comes under the jurisdiction of the Regional Water Quality Control Board – Los Angeles Region (LARWQCB). The LARWQCB has adopted a number of basin plans for various TDMLs such as basin plan R10-007 for bacteria TMDL, basin plan 2007-014 for metals, basin plan 2007-012 & 2001-013 for trash, and basin plan 2003-009 for nutrients. CVWD will utilize these basin plans to determine if any treatment of surface water runoff is needed prior to recharge.

At one location, surface water flows will be sampled for water quality analyses. Samples will be collected at various times during the year, including a minimum of one dry-season low flow sample, one typical or average wet season flow (non-storm conditions) sample, and at least one sampling at the trailing end of peak storm water flows (such as one to two weeks after a peak storm flow and after the “first flush” of stormwater runoff has passed). Samples will be analyzed for a variety of constituents including metals, nitrate, nitrite, phosphate, oil and grease, and volatile organics. The complete list of analytes will be developed based on experience in the area and with input from the Watermaster and Task Force members.

Subtask 1.4 Compiling Data

The data gathered as part of Subtask 1.2 and Subtask 1.3 will be compiled into a database for evaluation, and reviewed for accuracy. Data entered into the system will be quality controlled by comparing output to the original data. This task will be completed by a consultant.

Subtask 1.5 Stormwater Flow and Quality Technical Memorandum

A stormwater flow and quality technical memorandum (TM) will be prepared using the data compiled under Subtask 1.4 by a consultant. This TM will present and summarize the stormwater flow and quality data collected. In addition, the TM will include:

- An evaluation of the amount of stormwater potentially available from future stormwater flows in the Verdugo Wash and the Dunsmore Channel, and from runoff from the CVC Park parking lot area.
- An evaluation of the water quality of the stormwater in the channels and from the parking lot areas. This evaluation will include consideration of the impacts that infiltration of stormwater may have on the quality of the underlying groundwater.

The stormwater flow and quality TM and supporting data will be presented at the Task Force meetings so that stakeholders are aware of the data collected and the results of the data evaluations. By presenting the results of the stormwater flow and quality monitoring to the Task Force, stakeholders will be able to comment on these results and provide quality control input. Additionally, Task Force members will be able to identify how the results may be of interest to their agencies and how the data on the volume and timing of stormwater flows in the Verdugo Wash may be of use in identifying other channel or wash locations in the watershed where stormwater could be captured and recharged.

The TM and supporting data will be made available to the ULARA Watermaster. These data may help the Watermaster and other local water agencies and stakeholders in their programs to better manage and utilize water resources in the ULARA groundwater basins.

Task 1 Deliverable

Stormwater Flow and Quality Report

Task 2: Drilling and Installing Monitoring Wells and Water Level Monitoring

Task 2 will involve the drilling and installing of monitoring wells, and the monitoring of groundwater levels. The following quality assurance measures will be utilized under this task:

- Geological logging to be completed by a certified hydrogeologist under the direction of a California Professional Geologist according to industry standards.
- Use of standardized decontamination procedures, as documented in the field work plan.
- Calibration of field sampling equipment to commercially-purchased standards.
- Water Quality Samples - Use of field quality control samples (i.e. duplicates, trip blanks, matrix spike analyses) and chain-of-custody procedures
- Standardized logging and reporting per industry-standard procedures
- Water Quality Samples - Analytical tests shall be performed by an EPA and California Certified Analytical Laboratory and comply California Code of Regulations and Chapter 19 Certification of Environmental Laboratories
- Preparation of a Hydrogeological Survey Report will be completed by a California Professional Geologist
- Review of the Hydrogeological Survey Report by Dr. Iraj Nasser, Professor with the Department of Civil & Environmental engineering at the University of Southern California (USC) and input from the Task Force.

Subtask 2.1 Coordination and Agreement with LACDPW

This subtask will involve coordination with Los Angeles County, Department of Public Works with respect to access and maintenance agreements for the drilling and maintenance of monitoring wells. This task will be completed by CVWD staff.

Subtask 2.2 Preliminary Design and Location

Preliminary design and locations for at least two monitoring wells will be completed under this Subtask. Preliminary design will be completed by a Professional Hydrogeologist. Possible well locations will be discussed with Los Angeles County Parks Department and with the City of Glendale. Well permits will be obtained from the Los Angeles County Health Department.

Subtask 2.3 Design Plans and Specifications

This subtask will develop design plans and specifications for at least two monitoring wells according to the preliminary design completed under Subtask 2.2. The design plans and specifications will be completed by a Professional Hydrogeologist.

Subtask 2.4 Construction – 2 wells

The purpose of this subtask will be to install at least two monitoring wells within CVC Park to assess the soil conditions, soil lithology or composition, depth to bedrock, and groundwater level. This information will be used to determine the optimal location to install the infiltration

galleries, to assess the amount of storage space available for recharged water, and to monitor groundwater movement after installation.

The drilling and installation of the monitoring wells will be performed by a drilling contractor. Prior to drilling, possible well locations will be discussed with Los Angeles County Parks Department and with the City of Glendale. Well permits will be obtained from the Los Angeles County Health Department. During drilling, soil conditions will be observed and lithologic logs prepared to document the conditions encountered. Depending on the drilling method used, in addition to the lithologic logs, geophysical logging of the boreholes may also be performed. Previous studies in the Verdugo Basin suggest that the depth to bedrock in the area is less than 150 feet, and the boreholes for the monitoring wells will be drilled to bedrock or a maximum depth of 150 feet.

Soil samples will be collected at regular depth intervals and selected samples will be submitted for laboratory analyses for grain size. The grain size analyses results will be used to develop estimates of permeability of sediments above and below the water table.

The monitoring wells will be constructed of 4-inch diameter PVC casing, perforated from the water table to maximum depth. The depth of perforations and other well construction aspects will be determined based on the conditions encountered in the field. The wells will be developed and at the conclusion of development activities, a groundwater sample will be collected from each well. The samples will be collected using widely accepted sample collection and handling procedures. The samples will be analyzed for total dissolved solids, general minerals, nitrate, oil and grease, volatile organic compounds (VOCs), and pesticides.

The depth to water in the monitoring wells will be monitored over a period of one year with data loggers in each well that will be logging reporting data four to six times per day for the year. The water level data will be considered along with other water level data for the Verdugo Basin in estimating the average depth to groundwater beneath the CVC Park and surrounding area, both during the one-year monitoring period and in the future. The range in the depth to groundwater beneath the park will be estimated based on the water level data collected for this task and on historical water level data from CVWD's extraction wells and from monitoring wells in the area.

The results of the drilling and well installation will be quality control reviewed by Dr. Iraj Nasser, Professor with the Department of Civil & Environmental engineering at USC. These results and data will then be presented at the Task Force meetings, providing an opportunity for stakeholders to comment on the data and provide input to CVWD during the course of the study.

Subtask 2.5 Contract Administration

CVWD will serve as the lead agency responsible for contract administration. CVWD will be responsible for compliance with program requirements (State and federal laws, labor code compliance, CEQA compliance, monitoring and data submittal, and maintenance of project materials during the life of the agreement, accounting records, and internal controls). CVWD will maintain supporting documents showing the calculation of administrative costs and contractor or agency staff payroll records. Quarterly and final project invoices and reports (or other related information as required by DWR) will be submitted by CVWD with backup information retained.

Subtask 2.6 Field Work

This subtask will involve the work to monitor the wells and collect samples under direction of a Professional Hydrogeologist. Soil samples will be collected at regular depth intervals and selected samples will be submitted for laboratory analyses for grain size. The grain size analyses results will be used to develop estimates of permeability of sediments above and below the water table.

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The results of the water level monitoring will be quality control reviewed by Dr. Iraj Nasseri, Professor with the Department of Civil & Environmental engineering at USC.

Subtask 2.7 Water Quality Sampling and Analysis

Water quality sampling and analysis of groundwater from the monitoring wells will task place over a one year period. The monitoring wells will be sampled every month for 10 months under direction of CVWD certified personnel and sent to a certified water quality laboratory. The samples will be collected using widely accepted sample collection and handling procedures. The samples will be analyzed for total dissolved solids, general minerals, nitrate, oil and grease, volatile organic compounds (VOCs), and pesticides per Department of Public Health's Title 22.

The results of the water quality analyses and water level monitoring will be quality control reviewed by Dr. Iraj Nasseri, Professor with the Department of Civil & Environmental engineering at USC.

Subtask 2.8 Analysis of Data

The results of the drilling, well installations, water quality analyses, and water level monitoring will be quality control reviewed by Dr. Iraj Nasseri, Professor with the Department of Civil & Environmental engineering at USC. These results and data will be presented at the Task Force meetings, providing an opportunity for stakeholders to comment on the data and provide input to CVWD during the course of the study.

The results of all data analyses will be quality control reviewed by Dr. Iraj Nasseri, Professor with the Department of Civil & Environmental engineering at USC.

Subtask 2.9 Monitoring Well Technical Memorandums

Three TMs and a DWR well completion report will be prepared by a California Professional Hydrogeologist as follows:

DWR Well Completion Report. This report will document the installation of the monitoring well as required by DWR using Form 188.

Well Construction Technical Memorandum. This TM will document the installation of the monitoring wells. It will include drilling logs, well construction diagrams, and the results of the soil analyses. Water quality analyses results will also be included in the report along with an indication of which analytes, if any, exceed applicable water quality standards for groundwater. Copies of the TM will be provided to the ULARA Watermaster.

Water Level Monitoring Technical Memorandum. At the conclusion of the monitoring period, CVWD will provide the water level data to the ULARA Watermaster and other interested agencies and parties as part of a TM.

These TMs and data will be reviewed by Dr. Iraj Nasserri, revised, then presented at the Task Force meetings, providing an opportunity for stakeholders to comment on the data and provide input to CVWD during the course of the study.

Task 2 Deliverables

DWR Well Completion Report – Form 188

Well Construction TM

Water Level Monitoring TM

Task 3: Perform Infiltration Tests

A review of available geologic and soils data for the Verdugo Basin indicates that the soils and sediments in the basin are generally coarse-grained materials that would be conducive to infiltrating stormwater. More site-specific infiltration data, however, will be collected as part of this task.

In order to evaluate the infiltration capacity of the soils for recharging stormwater, infiltration tests will be performed at a minimum of three locations. To the degree possible, the infiltration tests will be performed at locations at CVC Park where representative conditions are thought to occur and where infiltration galleries could be installed. Possible locations for the galleries will depend in part on where stormwater can be collected in the Verdugo Wash and Dunsmore Channel and the location of the CVC Park parking lot. Potential locations for the tests will be discussed with the Los Angeles County Parks Department and the City of Glendale before tests are performed.

Quality assurance measures will include:

- Observation pits will be excavated by a general contractor and according to industry standards and OSHA safety standards

- Soil profile information will be collected by a trained geologist under direction of a California Professional Geologist and California Certified Engineering Geologist according to industry standards
- Percolation tests to be completed by a trained geologist under the direction of a California Professional Geologist and California Certified Hydrogeologist according to industry standards
- Standardized reporting per industry-standard procedures
- Preparation of the Percolation Report will be completed by a California Professional Geologist and Certified Hydrogeologist.
- Review of the Percolation Report by Dr. Iraj Nasser, Professor with the Department of Civil & Environmental engineering at the University of Southern California (USC) and input from the Task Force.

Subtask 3.1 Coordination and Agreement with LACDPW

This subtask will involve coordination with Los Angeles County, Department of Public Works with respect to access and maintenance agreements to conduct infiltration tests.

Subtask 3.2 Preliminary Design and Location

Preliminary design and locations of infiltration test pits will be completed by a California Certified Hydrogeologist. It is assumed that the infiltration tests will be performed using a pit infiltration method approved by the LACDPW for evaluation of soil infiltration for septic systems. Considering that recharge galleries or other recharge structures would likely be located several feet below ground surface, the infiltration test pits will be located a few feet below the existing grade in larger backhoe pits.

Subtask 3.3 Design Plans and Specifications

Final design plans and specifications for the excavation of the infiltration pits will be completed under Subtask 3.3 according to the results of Subtask 3.2 by a California Certified Hydrogeologist. The plans will indicate the locations for the test pits and the specifications will provide information regarding the depth of the test pits, and details regarding how the tests are to be conducted and documented, and the data to be collected in the field.

Subtask 3.4 Construction

The construction of infiltration pits will be completed by a licensed contractor according to the design plans and specifications developed under Subtask 3.3. A backhoe will be used to excavate the pits.

Subtask 3.5 Contract Administration

CVWD will serve as the lead agency responsible for contract administration. CVWD will be responsible for compliance with program requirements (State and federal laws, labor code compliance, CEQA compliance, monitoring and data submittal, and maintenance of project materials during the life of the agreement, accounting records, and internal controls). CVWD will maintain supporting documents showing the calculation of administrative costs and contractor or agency staff payroll records. Quarterly and final project invoices and reports (or

other related information as required by DWR) will be submitted by CVWD with backup information retained.

Subtask 3.6 Field Work

Subtask 3.6 will involve the conducting of the infiltration test to assess the percolation rate of the soil. The test will be conducted according to industry standards by an experienced geologist, hydrogeologist, or engineer under the oversight of a California Certified Hydrogeologist and Certified Engineering Geologist. Prior to the infiltration test, the soil conditions in each infiltration pit will be logged and photographed.

Subtask 3.7 Analysis of Data

The results of the percolation test will be quality control reviewed and analyzed by Dr. Iraj Nasser. These results and data will be presented at the Task Force meetings, providing an opportunity for stakeholders to comment on the data and provide input to CVWD during the course of the study.

Subtask 3.8 Infiltration Test Technical Memorandum(TM)

The results of the percolation testing will be summarized in a brief TM. The TM will include figures and tables showing the locations of the three tests, the test setup, and results of the testing. The report will also include an evaluation of the test results and conclusions regarding the infiltration capacity of the soils beneath CVC Park at locations where infiltration galleries might be located. The Infiltration Testing TM will be made available to the ULARA Watermaster and other stakeholders.

The results of the testing will be presented at a Task Force meeting, and will be discussed with the ULARA Watermaster.

Task 3 Deliverable

Infiltration Test TM

Task 4: Topographic Survey

This task will include performing an aerial topographic survey to establish a contour map that will also show existing structures, utilities and other facilities within the project area. Quality assurance measures include:

- Topographic survey to be conducted by Licensed California Land Surveyor
- Preparation of a topographic survey report will be completed by Licensed California Land Surveyor
- Standardized reporting per industry-standard procedures
- Internal review of the Topographic Survey Report by CVWD prior to review by the Task Force
- Review of the Topographic Survey Report by the Task Force

Subtask 4.1 Coordination and Agreement with LACDPW

This subtask will involve coordination with Los Angeles County, Department of Public Works with respect to access and maintenance agreements to conduct the topographic survey.

Subtask 4.2 Preliminary Site Investigation

This subtask will involve a field visit to verify the limits of work, coordination with Los Angeles County on benchmark and basis of bearings, and obtaining a title report to verify property lines and any easements that encumber the site.

Subtask 4.3 Aerial Topographic Survey

This subtask will involve a license Surveyor will set and tie out eight (8) aerial control targets for the preparation of an Aerial Topographic Map. The aerial targets will be tied horizontally to VTM - NAD83 Zone 5 and the vertical datum will be based on a local Los Angeles County benchmark. Also, provide one (1) aerial topographic map compiled at a scale of 1" = 40' with two (2) foot contour intervals.

Subtask 4.4 Field Survey

This subtask will include performing a Field Topographic Survey of key topographic features that are not depicted on the aerial map, including trees. The survey will include key features north of the Verdugo Wash.

Subtask 4.5 Identify and Catalog Trees

The existing trees located north of the Verdugo Wash at CVC Park will be located, identified and cataloged under Subtask 4.5 to determine which trees, such as Coastal Oaks, need to be protected. This information will be vital in assisting in locating the monitoring wells, infiltration pits and placing the infiltration galleries in the optimal location. This will be conducted by a certified arborist.

Subtask 4.6 Topographic Survey Technical Memorandum

A topographic survey TM will be developed using the results of the site investigation, topographic survey, field survey and tree cataloging.

Task 4 Deliverable

Topographic Survey TM

Task 5: Groundwater Modeling

CVWD and its consultants prepared and implemented a groundwater computer model as part of the "Verdugo Basin Groundwater Recharge, Storage and Conjunctive Use Feasibility Study". As part of that study, CVWD evaluated the potential for artificial recharge in the Verdugo Basin at various locations. This earlier modeling indicated that artificial recharge beneath CVC Park may be feasible and that additional data were needed to refine recharge estimates. Quality assurance measures under this task include:

- Groundwater data acquisition, interpretation:
 - Graphical verification of data through examination of outliers in time series data
 - Map based verification of data through examination of outliers in contoured data
- Use of the groundwater flow model previously developed for CVWD. This model is a U.S. Geological Survey ModFlow based model prepared using the Groundwater Vistas software program.
- Review of the groundwater model and results by a California Professional Geologist and Certified Hydrogeologist.
- Internal review of the Groundwater Modeling Report by CVWD prior to distribution to the task force
- Review of the Groundwater Modeling Report by Dr. Iraj Nasser, Professor with the Department of Civil & Environmental engineering at the University of Southern California (USC) and input from the Task Force.

Subtask 5.1 Input Updated Geologic and Groundwater Data

As part of this subtask, the groundwater model will be updated using the results of the monitoring well installation, groundwater level monitoring, and infiltration testing. Data entered into the model will be quality controlled by comparing output to the original data.

Subtask 5.2 Updated Groundwater Model

The updated groundwater model will be used to evaluate the recharge of stormwater at selected locations beneath CVC Park.

Important considerations for the modeling will be to evaluate the potential for groundwater mounding beneath the park and surrounding area as a result of infiltration of stormwater. Modeling will be used to estimate the degree of mounding that may occur with various amounts of recharge and with various initial groundwater conditions. Mounding considerations include shallow groundwater conditions that could impact the root zones for Coastal Oak Trees at the CVC Park and conditions that could increase or create a liquefaction hazard in the area.

The modeling will also provide information on the flow of the recharged water outward from the infiltration galleries. This information will be used to evaluate the ability of groundwater producers in the Basin; CVWD and the City of Glendale, to capture the recharged water so that it is not lost from the groundwater basin as subsurface outflow or rising groundwater.

The results of the modeling and evaluations will be presented to the Task Force and discussed with the ULARA Watermaster. The modeling will help improve the overall understanding of groundwater conditions in the Verdugo Basin and will be useful to CVWD, the Watermaster, and the City of Glendale in managing groundwater resources in the Basin and the ULARA.

Subtask 5.3 Groundwater Modeling Technical Memorandum

The results of the groundwater modeling will be summarized in a brief TM. The TM will include a description of the modeling work performed. Tables and figures in the report will provide

information on the scenarios modeled, the degree of groundwater mounding anticipated, and resulting groundwater flow outward from the recharge area.

Task 5 Deliverable

Groundwater Modeling TM

Task 6: Environmental and Regulatory Compliance, and Permit Review

In this task, CVWD will develop the environmental and regulatory compliance documents and obtain the permits necessary to complete Tasks 1, 2 and 3. The following items are likely to be necessary:

- Environmental and Regulatory Compliance
 - CEQA Environmental Checklist and Initial Study
 - CEQA Mitigated Negative Declaration
 - California Department of Fish and Game (CDFG) Consultation
 - DWR Well Completion Report
- Permits
 - RWQCB NPDES Permit
 - Los Angeles County Department of Public Health Well Construction Permit
 - Los Angeles County Flood Control District Permit
 - City of Glendale, Department of Public Works Construction Permit

CVWD will pursue environmental and regulatory compliance by contacting the agencies to which applications and documents will be submitted. Quality assurance measures will include:

- CVWD and consultant will work with Regulating agencies directly to assure the quality of environmental and regulatory compliance and permit requirements
- Review of the Environmental and Regulatory Compliance, and Permits by the Task Force

Subtask 6.1 CEQA – Environmental Checklist

To comply with CEQA requirements, CVWD will complete the Environmental Checklist to determine what level of environmental compliance will be required. A consultant will complete the Environmental Checklist and necessary studies to complete the checklist. It is estimated that this subtask will take approximately three months to complete, and will be started at the outset of the project.

Subtask 6.2 CEQA – Mitigated Negative Declaration

Based on previous experience in the construction of monitoring wells, CVWD predicts that a Mitigated Negative Declaration will be required to be compliant with CEQA. Under Subtask 6.2, a consultant will prepare a Mitigated Negative Declaration to be reviewed by CVWD staff prior to being submitted to the state. It is estimated that this subtask will take approximately two months to complete, and will take place once the Environmental Checklist is complete.

Subtask 6.3 RWQCB – NPDES Permit

Following completion of Subtask 6.2, CVWD will pursue a NPDES Permit through the Los Angeles RWQCB for construction of the monitoring well and excavation of infiltration pits. It is

estimated that the RWQCB NPDES permit will take three to four months to obtain. CVWD will begin working with the RWQCB at the outset of the project to obtain this permit.

Subtask 6.4 Los Angeles County, Department of Public Health Permit

A well construction permit will be required from the Los Angeles County Department of Public Health services in order to construct the monitoring wells. CVWD estimates that it will take approximately three months to obtain this permit. CVWD will begin working with Los Angeles County at the outset of the project.

Subtask 6.5 City of Glendale, Department of Public Works

CVWD will obtain the necessary construction permits from the Department of Public Works for the construction of the monitoring wells. CVWD estimates that it will take less than one month to obtain this permit, and will pursue it at the completion of the Environmental Checklist.

Subtask 6.6 California Department of Fish and Game

CVWD will approach the CDFG to determine what agreements may be required. In particular, CVWD will work with CDFG to determine whether a Streambed Alteration Agreement will be required or permits will be required. It will be necessary for CEQA compliance to be complete prior to approval by CDFG, and will pursue this task at the completion of the Environmental Checklist.

Subtask 6.7 Additional Compliance/Permitting

This subtask is in place to allow for any additional environmental compliance and/or permitting requirements found to be necessary during the process of completing Task 6.

Task 6 Deliverables

CEQA Initial Study

CEQA Mitigated Negative Declaration

Los Angeles County, Department of Public Health well construction permit

City of Glendale, Department of Public Works construction permit

California Department of Fish and Game Streambed Alteration Agreement (if necessary)

Task 7: Development of Stormwater Recharge Study

The deliverables developed in Tasks 1, 2, 3, 4 and 5 will be compiled to create the Crescenta Valley County Park Stormwater Recharge Project Facility Study report. CVWD will analyze the data produced through these tasks, and create an overall recommendation with respect to proposed infiltration locations and upgrades to the existing parking areas. The Study will include information and conclusions regarding:

- The amount of potentially available stormwater for recharge, including water flowing in the Verdugo Wash, Dunsmore Channel, and from the CVC Park parking lot.
- CVWD will collaborate with LACDPW to confirm potential storm water diversion locations, different types of diversion structures, and the approach to diverting water from the channel

- The timing of stormwater availability considering peak storm flows, early and late runoff from storm events, and summertime low-flows.
- Discussions with LACDPW regarding their preferences and constraints for diversion structures that might be installed in the channels. Such structures and modifications could include rubber dams, modifications to channel bottoms or sides, trash and debris collection or diversion structures. As appropriate, Task Force members will be consulted regarding possible diversion and treatment methods.
- Locations where stormwater could be diverted from the channels and possible types of diversion facilities such as rubber dams in the channels and stormwater inlets on the parking lot.
- The quality of stormwater and possible affects of recharge on groundwater quality.
- Soil infiltration capacity and groundwater mounding that may occur as a result of stormwater infiltration. This would include consideration of possible groundwater mounding impacts to overlying landscaping, Coastal Oak trees and other trees and existing buildings and facilities in the area.
- The conceptual design of infiltration facilities including stormwater diversion structures in the Verdugo Wash and Dunsmore Channel and stormwater capture structures for the CVC Park parking lot, treatment facilities such as trash grates and siltation basins to remove sediment from the stormwater, and infiltration galleries.
- The benefits resulting from a stormwater infiltration facility at CVC Park and long-term operation and monitoring considerations.

The data and conclusions from tasks 1 through 5 will be quality control reviewed by Dr. Iraj Nasseri. Dr. Nasseri's input will be incorporated into the analyses and conclusions from the study. The Task Force will review all TMs to give feedback to CVWD throughout the duration of the Study.

Once a draft report is prepared, it will be reviewed internally by CVWD staff and by Dr. Iraj Nasseri. The draft will then be distributed to the Task Force and DWR for comment.

All comments will be incorporated into a final report.

Subtask 7.1 50% Preliminary Stormwater Recharge Study

This subtask will provide a Preliminary Stormwater Recharge Study report will be prepared and submitted to CVWD by a Consultant to obtain preliminary feedback on the Study.

Subtask 7.2 100% Draft Stormwater Recharge Study

The 100% Draft Stormwater Recharge Study will be completed by the Consultant after having received comments on the 50% Preliminary Study.

Subtask 7.3 Comments from DWR and Other Stakeholders

The 100% Draft Stormwater Recharge Study will be submitted to DWR and other stakeholders for comment, which will allow for public input about the Study. The Consultant will work with DWR and Stakeholders to obtain clarification on comments received.

Subtask 7.4 Final Stormwater Recharge Study

Following the receipt of comments under Subtask 7.3, the Consultant will incorporate the comments into the Draft to create a Final Stormwater Recharge Study.

Task 7 Deliverables

100% Draft Stormwater Recharge Study report

Final Stormwater Recharge Study report

Task 8: Task Force Group

Specific work will be undertaken by CVWD to ensure collaboration and outreach to and encourage participation and collaboration by local public agencies, regional stakeholders and the general public, and State and federal agencies. The Outreach process will include CVC Park Stormwater Study Task Force (Task Force) meetings and various forms of communication. Quality assurance will be ensured under this task through internal CVWD review of Task Force meeting agendas, notes and handouts prepared prior to each meeting.

Subtask 8.1 Coordination with Task Force Group

In this subtask, CVWD will identify the stakeholders in the area who will be involved in the project. A Task Force will be established for the study which includes the following agencies:

- LACDPW
- Los Angeles County Department of Public Parks and Recreation
- City of Glendale
- ULARA Watermaster
- Council for Watershed Health
- Foothill Municipal Water District
- Southern California Water Committee
- Regional Water Quality Control Board
- Crescenta Valley Town Council
- Tree People
- Los Angeles County Supervisor Michael Antonovich
- Crescenta Valley Water District
- General Public
- ULARA Watermaster
- Department of Water Resources, Southern California
- State Water Resources Control Board
- United States Bureau of Reclamation
- United States Environmental Protection Agency

Stakeholders will be contacted via email, local news articles, CVWD's website and via press releases to solicit attendance at Task Force meetings.

Subtask 8.2 Task Force Meetings

The Project's advisory group will meet on a quarterly basis and will be involved in the planning of the project with respect to the location of the infiltration basins and the upgrades to the existing parking areas. The Task Force will evaluate and oversee the data and conclusions of the Study, and interact and coordinate regarding design considerations. Meetings will be organized and conducted by a consultant hired by CVWD.

Task 8 Deliverables

Agendas, handouts and meeting notes from Task Force Group meetings

Task 9: Administration

In this task, CVWD will coordinate with DWR to develop and administrate its contract, develop quarterly and final reports, and coordinate with DWR's project manager on progress and unanticipated activities. Quality assurance will be ensured through internal review by CVWD staff.

Subtask 9.1 Quarterly Reports

CVWD will prepare quarterly reports for submittal to DWR on a quarterly basis.

Subtask 9.1 Final Report

CVWD will prepare a final report for submittal to DWR at the conclusion of the project.

Task 9 Deliverables

Quarterly Reports

Final Report

Property Access

This project is located within CVC Park which is owned and operated by Los Angeles County, Parks & Recreation. CVWD will be working with LA County to obtain permission either through permits or agreements to install and maintain the channel gauges and monitoring wells.

Environmental Compliance and Permitting

Environmental compliance permitting items are addressed under Task 6: Environmental and Regulatory Compliance, and Permit Review.

Progress and Performance Evaluation

Progress and performance of the project will be evaluated regularly. Quarterly reports will be prepared and provided to DWR to show the details of:

- Work performed;
- Major accomplishments;
- Issues or concerns that may affect the schedule or budget;
- Activities planned for the next period;
- Budget status information, and
- Schedule information.

The Task Force will help evaluate progress and performance. These meetings, as outlined in the Work Plan, represent milestones in the development of the GWMP. CVWD will provide the meeting notes from the Task Force as a part of the quarterly reports to DWR.